USR-GM3 User Guide

(USR-GM3)

File version: Ver1.0

USR-GM3 is highly-integrated UART to GSM/GPRS module, Users can easily make communication between serial device and cellphone and network device with it.
This module is different from the common modules on the market, it is the smallest GPRS DTU, plug-and-play device. Later version USR-GM3S will be with SIM card inside, more easier to use, it just need power supply.

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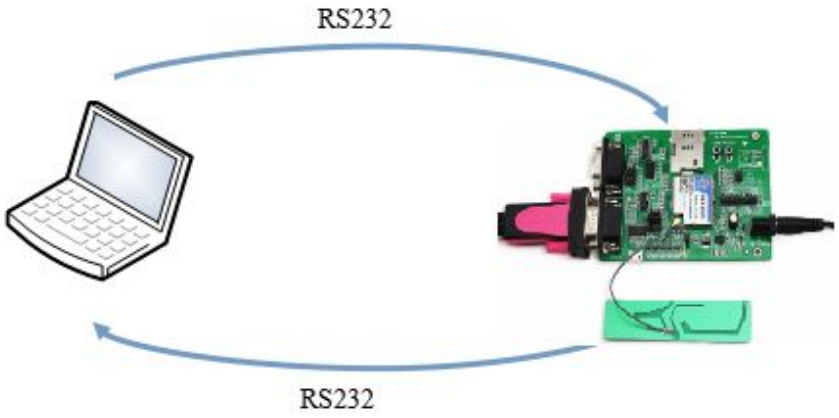
Quick Start

This chapter is a quick start guide for using USR-GM3 module. If it is the first time to use USR-GM3 for you, you should read this chapter carefully, and then follow the tips, try to do some tests by yourself. It will help you to know about USR-GM3 generally. If you have experience of using USR-GM3, please escape this chapter.

In this chapter, you will be told how to make communication between serial device and TCP server. Under default setting, GM3 module works in network transmission mode, it connects to our TCP test server, address is test.usr.cn, port is 2317. The server will respond what it receives.

All the software used in this document can be obtained from our website **www.usriot.com**. You can also access USR customer support center: **http://h.usriot.com**.

1.1. Testing environment



The voltage of module is TTL 3.3V, so you should not connect it with computer serial port directly, an adapter is necessary.

NOTE:

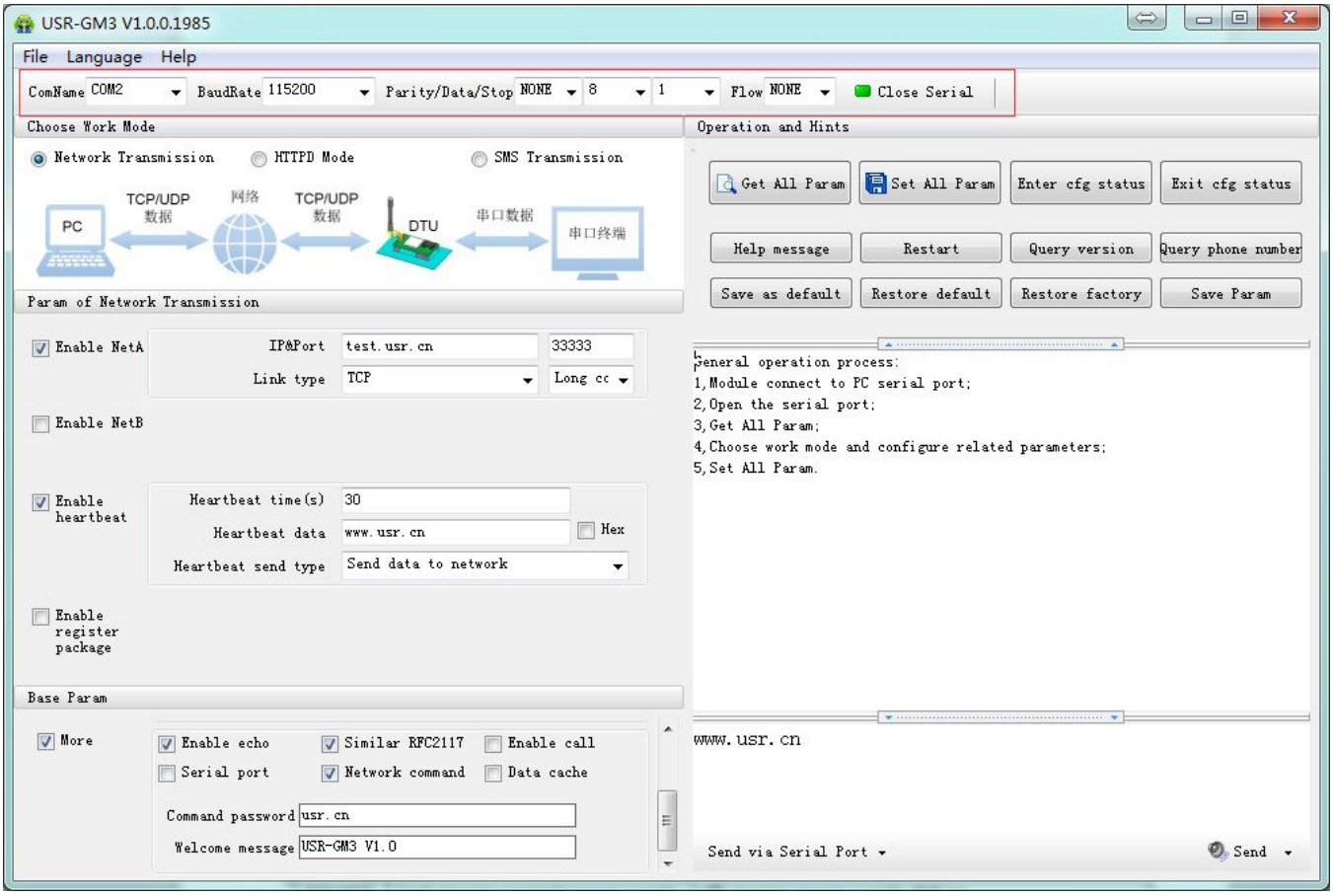
1. **If it is the first time to use our module for you, please use our EVK(Evaluation Kit) , it may save you lot of trouble and time.**
2. **keep default setting in this test.**

1.2. Transmission

1. Put SIM card into the socket on EVK, connect COM1 to PC's serial port with cable.

2. Open test software "USR-TCP232-Test", set right serial port number and baud rate, and open it. As the following figure.

3. Power up the EVK with DC 5V adapter, then the POWER led will be on, several seconds later, the WORK led will twinkle, and then GPRS LINKA led will be on.

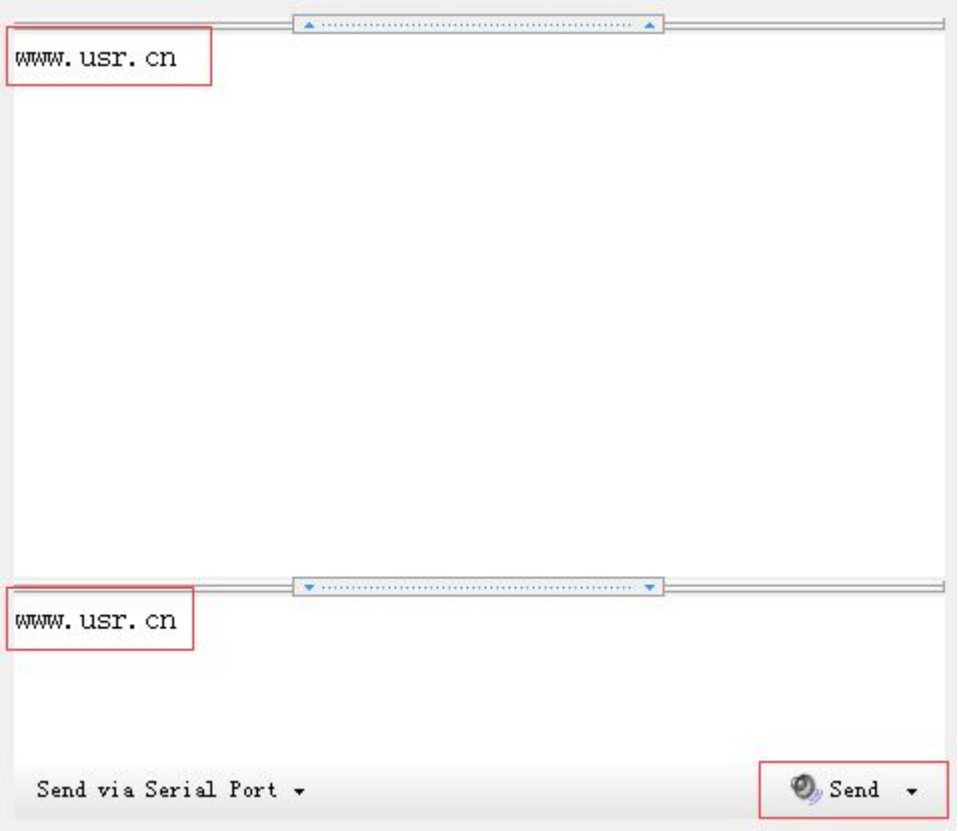

USR-GM3 V1.0.0.1985
File Language Help
ComName COM2 BaudRate 115200 Parity/Data/Stop NONE 8 1 Flow NONE Close Serial
Choose Work Mode
Network Transmission HTTPD Mode SMS Transmission
PC TCP/UDP 数据 网络 TCP/UDP 数据 DTU 串口数据 串口终端
Param of Network Transmission
Enable NetA IP&Port test.usr.cn 33333 Link type TCP Long cc
Enable NetB
Enable heartbeat Heartbeat time(s) 30 Heartbeat data www.usr.cn Hex Heartbeat send type Send data to network
Enable register package
Base Param
More Enable echo Similar RFC2117 Enable call Serial port Network command Data cache
Command password usr.cn
Welcome message USR-GM3 V1.0
Operation and Hints
Get All Param Set All Param Enter cfg status Exit cfg status
Help message Restart Query version Query phone number
Save as default Restore default Restore factory Save Param
General operation process:
1,Module connect to PC serial port;
2,Open the serial port;
3,Get All Param;
4,Choose work mode and configure related parameters;
5,Set All Param.
www.usr.cn
Send via Serial Port Send

Meaning of led:

POWER	"on" means normal power supply, "off" means power supply failure.
WORK	"blink" means running correctly, "off" means not running.
GPRS	"on" means attached, "off" means attach failure.
LINKA	"on" means socket A has connected to server, "off" means not connect.
LINKB	"on" means socket B has connected to server, "off" means not connect.

DATA	“blink” means transmission, “off” means no transmission.

4. Wait for LINKA led on, send data to module via serial port. For example, if you send “www.usr.cn”, at the same time, the DATA led will be on for a while. Then, you will get “www.usr.cn” in the receiving window from our test server.



2. Introduction

2.1. Short Description

USR-GM3 is new listing at 2015, it is one embedded GSM module. USR-GM3 is designed for embedded system, it is so small and convenient that you can integrate it to your system easily.

2.2. Characteristic

- Small and completed function GPRS DTU, transmission between serial and GPRS
- Support GSM850/900,DCS1800/1900
- Support GSM/GPRS/EDGE, support 2G/3G/4G SIM card, but based on 2G network
- Support 2 sockets, Support TCP and UDP
- 4KB cache for each of sockets, user can choose to cache data or not
- Support register package and heart beat package
- Support setting parameters via SMS message
- Support 4 work modes: SMS message transmission mode, network transmission mode and HTTPD mode
- Support basic and extend AT command sets
- Support similar RFC2217
- Support flow control: RTS/CTS
- Support RS485

2.3. Features

- Baud rate: 2400, 4800, 9600, 14400, 19200, 28800, 33600, 38400, 57600 115200, 230400, 460800, 921600.
- Operating voltage: 3.40V~4.20V
- Operating current: average 55mA~80mA, maximum 750mA
- Operating temperature: -40~+85°C
- Storage temperature: -40~+125°C
- Storage humidity: 5%~95%RH
- Max TX power : GSM900 class4(2W)，DCS1800 class1(1W)

2.4. Application Field

- In power industry, USR-GM3 can embedded in the electric meter, power application terminals and other equipment to realize of reactive power compensation monitoring, distribution monitoring, meter collection and copy, street lamp controlling and other applications, to achieve smart city.

- In Heating field, USR-GM3 can be embedded in m-BUS concentrator to achieve the integration of the concentrator and wireless communication.

- In water industry, USR-GM3 is also plays a significant role in system of water set copy, water resource management and remote monitoring, wireless communication of water pipe network monitoring.

- In Environmental protection , USR-GM3 module can be integrated into the on-line monitoring system of flue gas on-line monitoring (CEMS), water quality online monitoring.

- In the field of equipment maintenance (Equipment maintenance field),USR-GM3 use in the system of equipment remote monitoring, such as elevator monitoring, air conditioning monitoring.

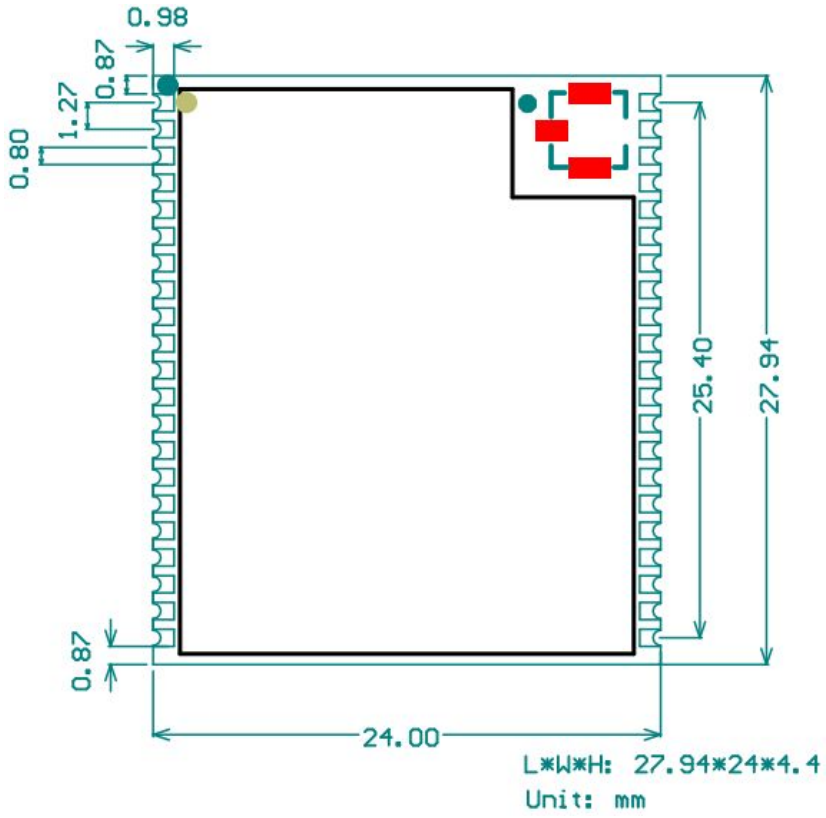
- Other GPRS communication applications .

3. Hardware

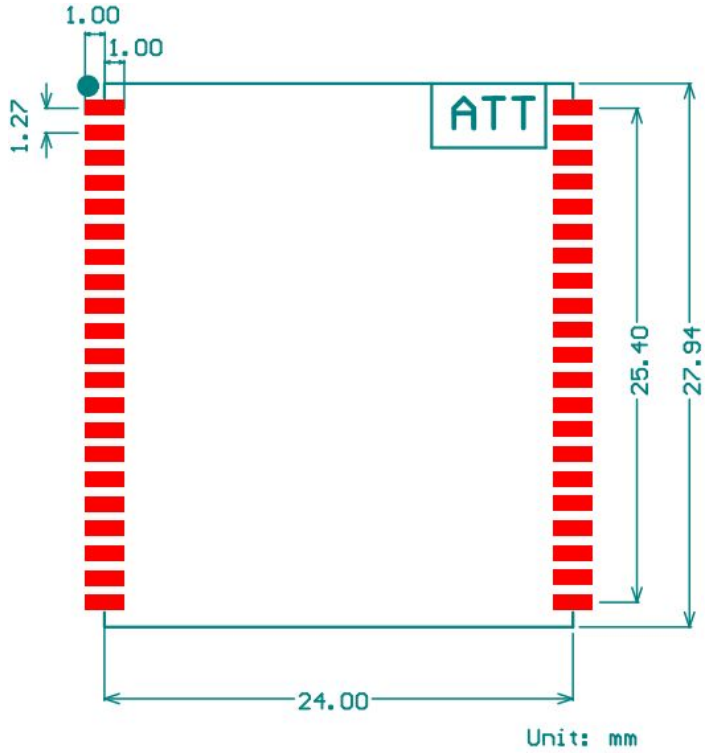
3.1. Pin Description

3.1.1. Outside View

3.1.2. Pin Assignment（Top）



3.1.3. PCB Layout



3.1.4. Pin Description

Note: ‘P’ for power, ‘I’ for input, ‘O’ for output, ‘N’ for not connect

Pin	Name	Type	Description
1	VCC	P	Power supply，3.3V to ground
2	VCC	P	Power supply，3.3V to ground
3	GND	P	Power ground
4	GND	P	Power ground
5	Reload	I	Pull-down 1s restore default setting, >3s restore factory setting
6	NC	N	Keep no connecting
7	RS485	O	Control RS485 RX/TX
8	NC	N	Keep no connecting
9	Reset	I	Restart, pull-down 1s for restart
10	GPRS	O	GPRS status, high for attached, low for not attached
11	LINKA	O	Socket A status, high for connected, low for not connected
12	LINKB	O	Socket B status, high for connected, low for not connected
13	DATA	O	Data status, high for transmission, low for not transmission
14	WORK	O	Running status, high for normal, low for failure
15	SHUT	I	Shut down, pull-down for shut module
16	NC	N	Keep no connecting
17	GND	P	Power ground
18	SPEAKER-	O	Speaker negative terminal
19	SPEAKER+	O	Speaker positive terminal
20	MIC-	I	Microphone negative terminal
21	MIC+	I	Microphone positive terminal
22	VSIM	P	Power supply for SIM card
23	SIM_CLK	O	Clock line for SIM
24	SIM_DAT	I/O	Data line for SIM
25	SIM_RST	O	Reset line for SIM
26	NC	N	Keep no connecting
27	NC	N	Keep no connecting
28	NC	N	Keep no connecting
29	V_PAD	P	2.8V output
30	NC	N	Keep no connecting
31	NC	N	Keep no connecting
32	NC	N	Keep no connecting
33	NC	N	Keep no connecting

34	NC	N	Keep no connecting
35	TXD1	O	TX line for uart1
36	RXD1	I	RX line for uart1
37	CTS1	O	CTS line for uart1
38	RTS1	I	RTS line for uart1
39	GND	P	Power ground
40	GND	P	Power ground
41	RF	O	RF output
42	GND	P	Power ground

3.1.5. Outside Antenna

1. The line of Antenna should be short to make the insert loss lower and routed as RF line strictly to keep 50ohm matching.

2. It’s better to put the antenna pad on the edge of the PCB.

4. Module Functions

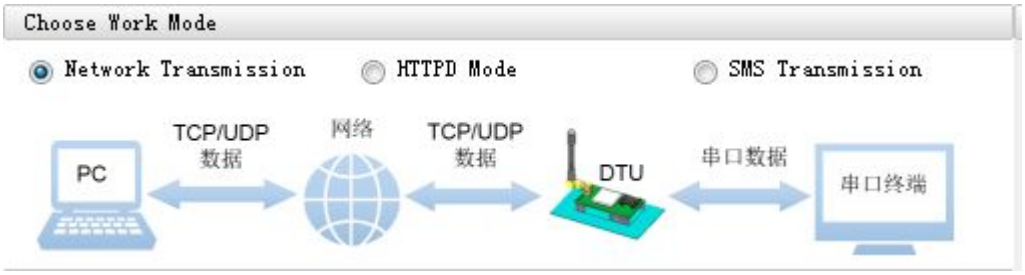
4.1. Work Mode

USR-GM3 module can work in 3 modes

- SMS message transmission mode
- network transmission mode
- HTTPD mode

4.1.1. Switching Work Mode

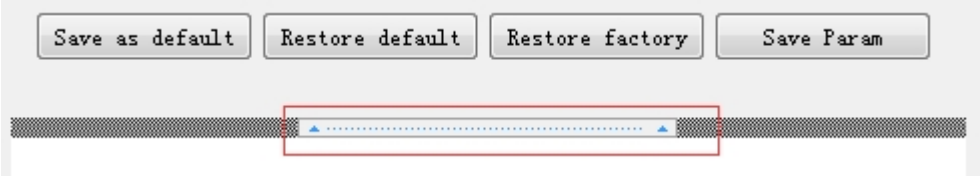
Choose by button you want to work mode



And then select save all parameters

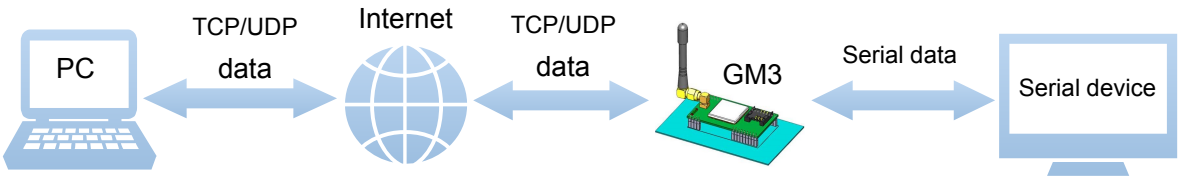
Can save the default parameters for the user, click on the restart after effective working mode.

Note: if you can't find the above tool buttons please refer to the picture's position on the drive, you can see the hidden button



4.1.2. Network transmission

4.1.2.1. Description



Under this mode, customer's serial device can send data to TCP or UDP server via this module, Module can also receive data from server, and transmit the data to customer's serial device.

Customers don't need to know the detail of communication, just need some simple setting.

GM3 support 2 sockets, socket A and socket B, they are standalone with each other. GM3 only supports TCP Client and UDP Client.

4.1.2.2. Application Scenarios

If user want to make communication between serial devices and devices on the network, but in the place where serial device stays using router to connect to network is not convenient for user. But signal from base station is available, so GM3 module can build a bridge between serial device and devices on the network .

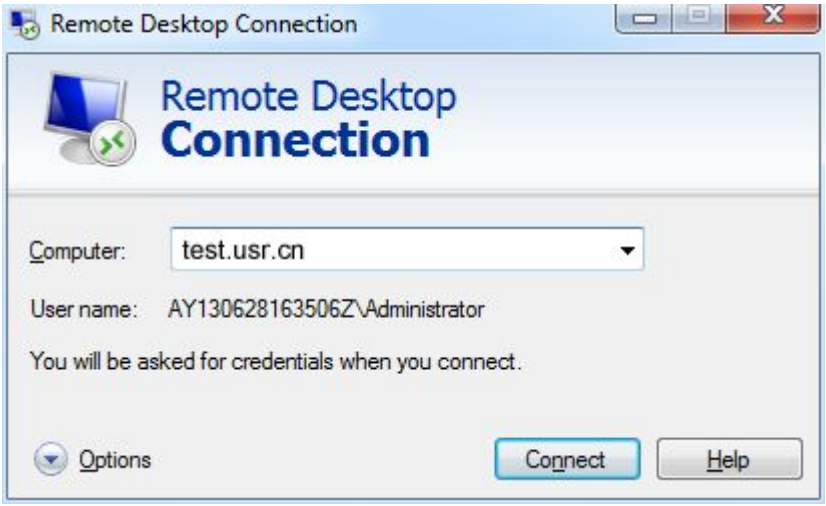
4.1.2.3. Usage

Note: All the AT commands terminate with carriage return(0x0D), we ignore it here.
About how to use AT commands, please refer to chapter 5.

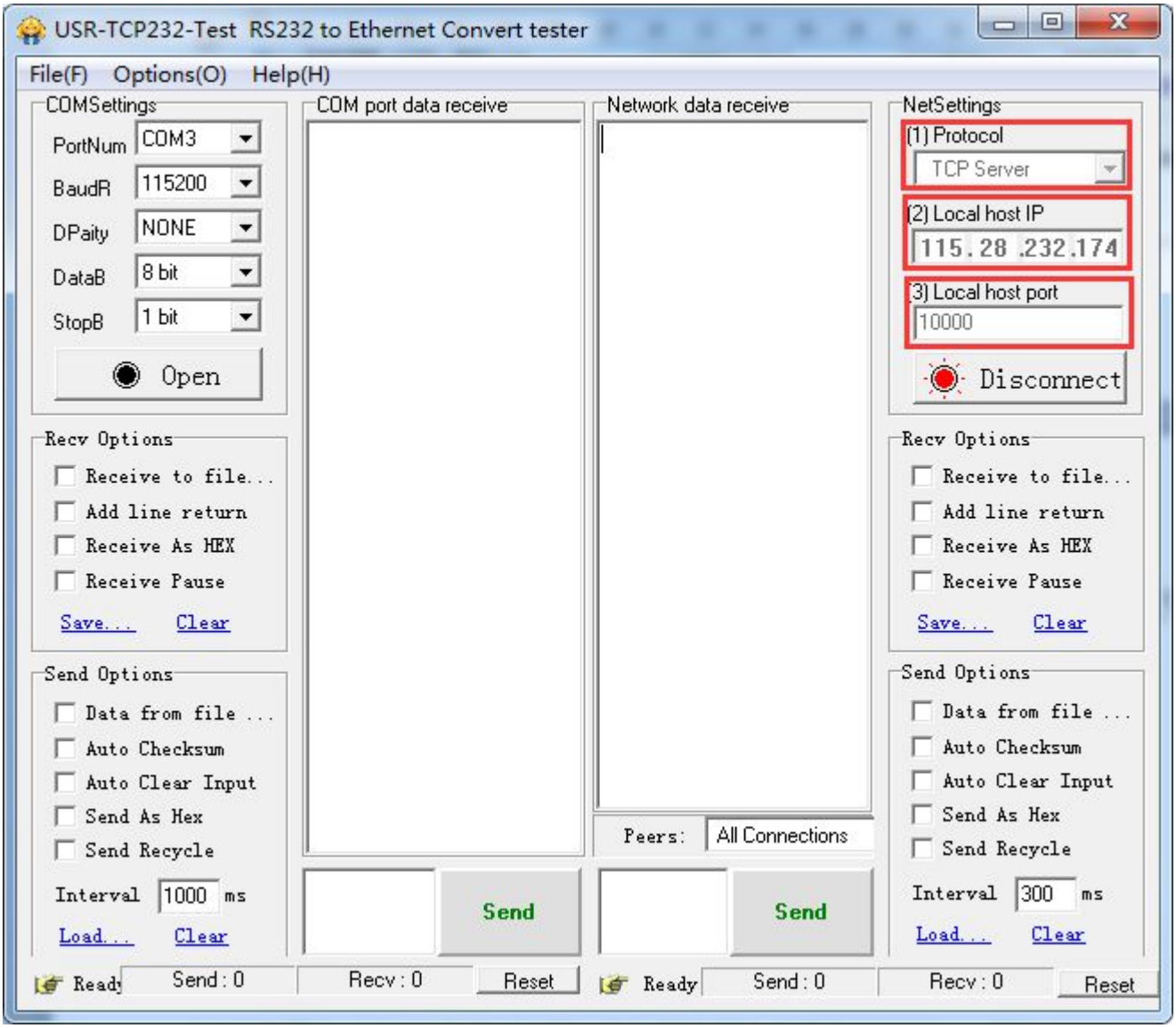
We have one software for customers to use, customers can get it from our website:**http://www.usriot.com/Download/248.html.**

And we have one software for customers to do serial and network tests, customers can get it from our website:**http://www.usriot.com/Product/78.html**.

1. Set TCP server software, log in remote server via remote desktop connection.

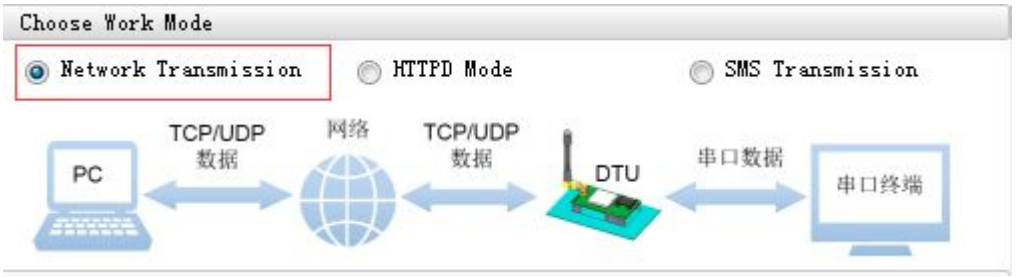


Then open network test software, set the parameters as the bellowing.

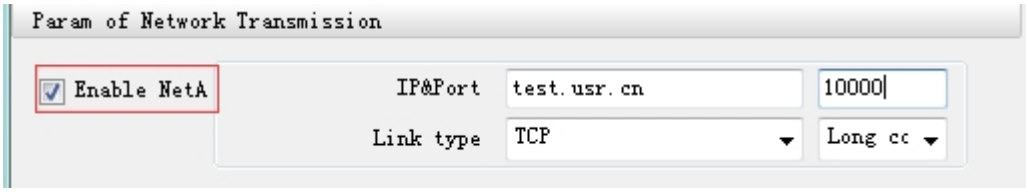


2. Set Module Parameters

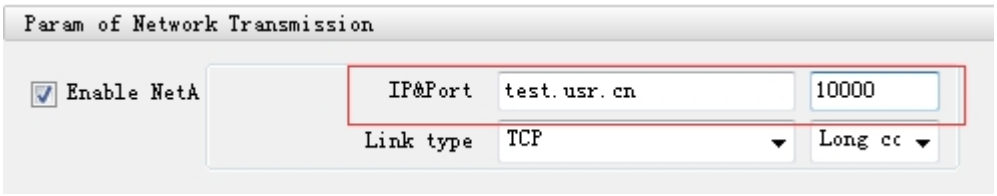
1) Set work mode as network transmission



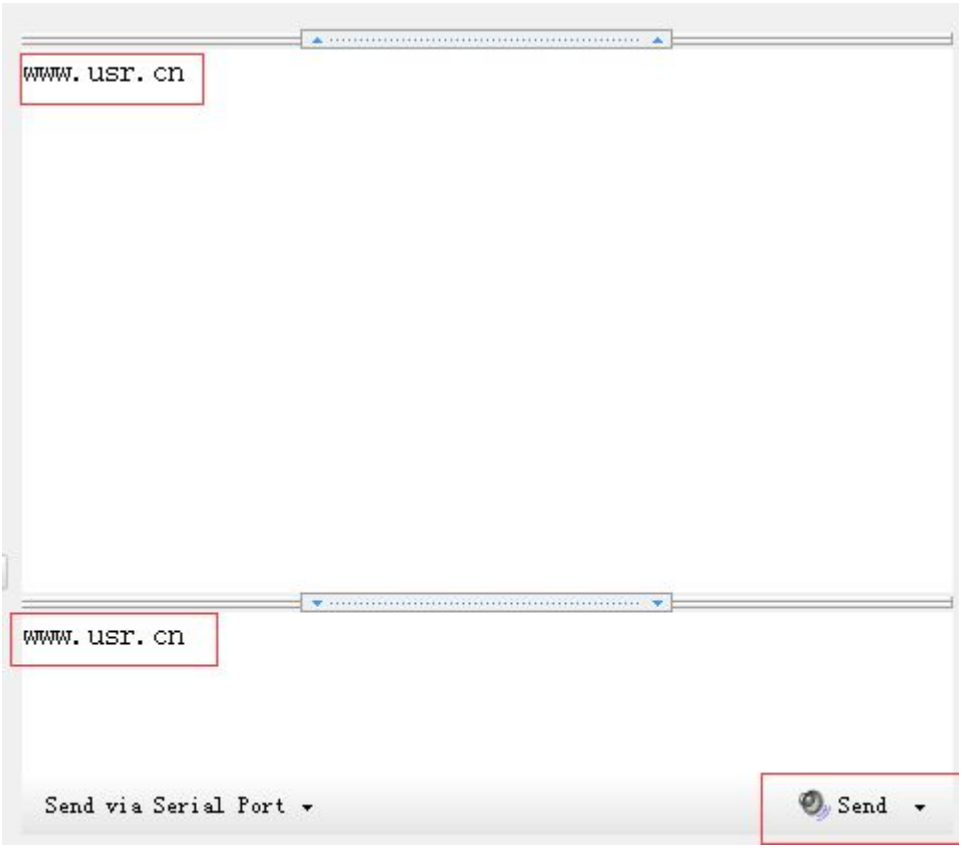
2) Enable socket A

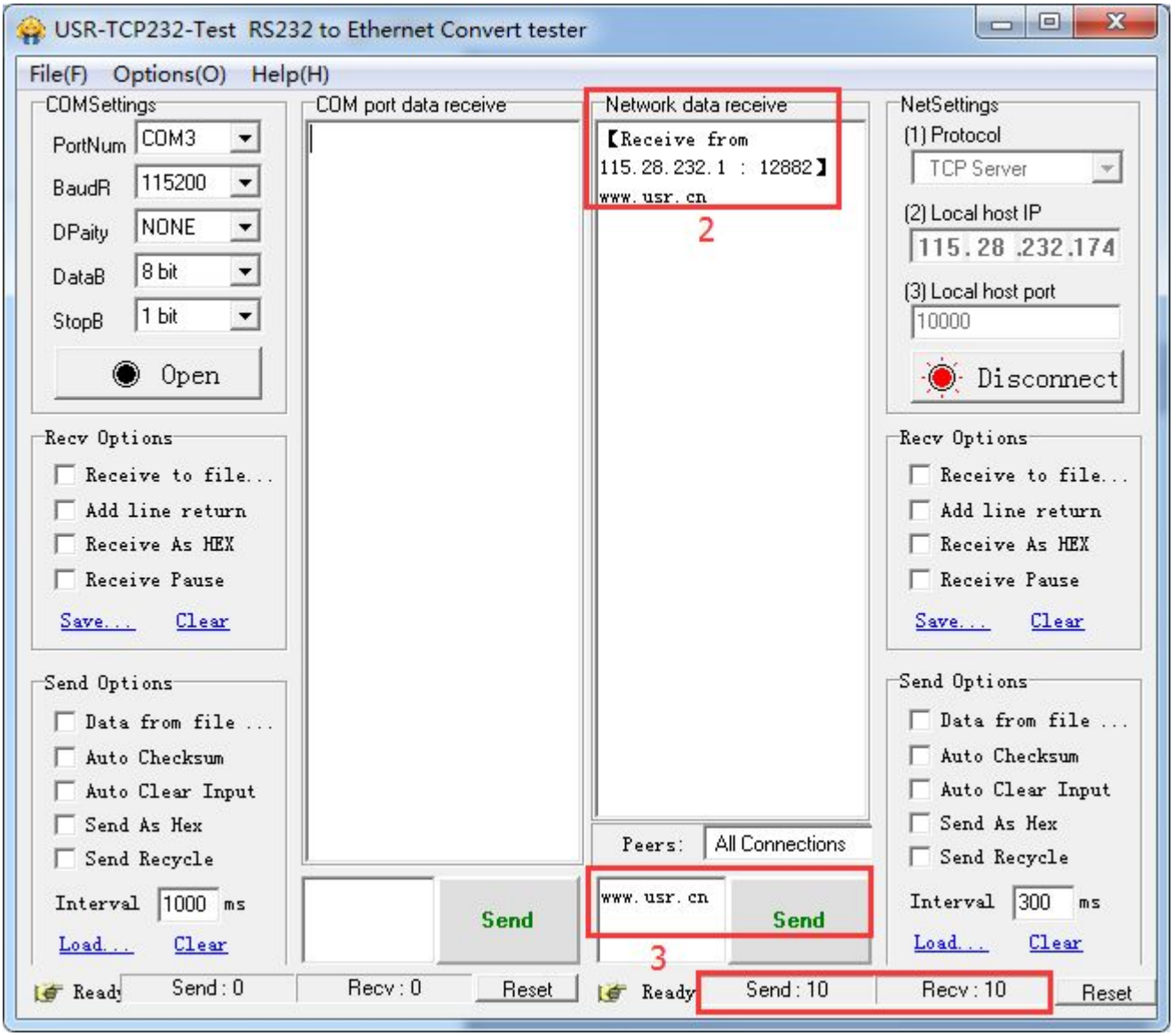


3) Set socket A as TCP client, server address is test.usr.cn(domain), server port is 10000.



3. Restart GM3, wait the connection of socket A has been established, send data to module via serial port, then you will get data at network server software. And send data to module via network, then the data will be got at module serial port.





4.1.2.4. Special Type Of Sending Command

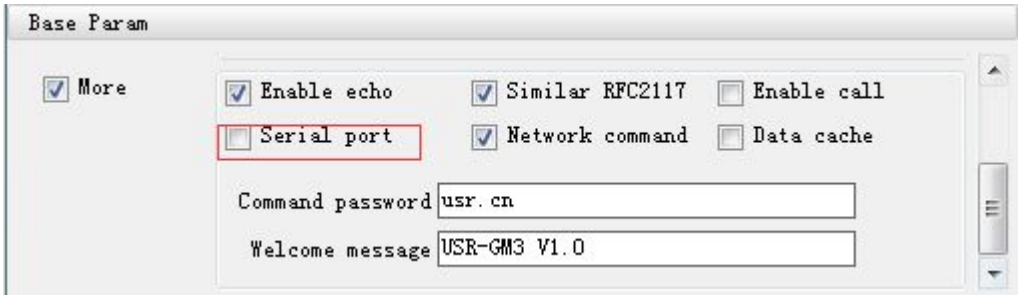
Besides under “AT command mode”, customers can also send At commands under network transmission mode via serial or network. This kind of commands is different from common ones, customers should add command password and # at the front of common command string,.

Note: every command string should terminate with carriage return. Here we use [0D].

4.1.2.4.1. Serial AT Command

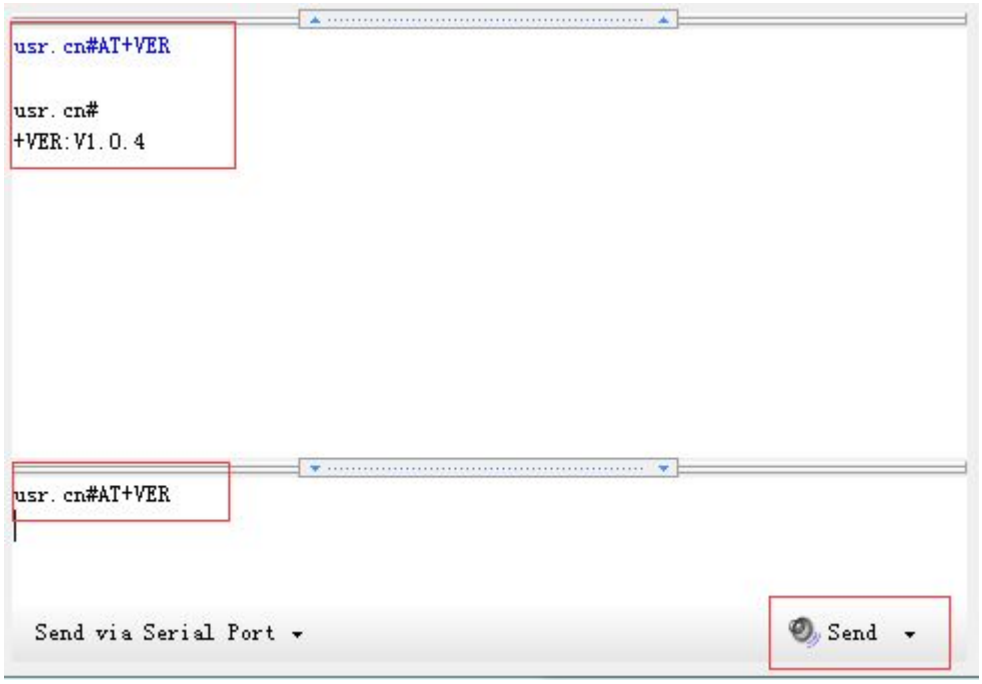
1. Set work mode as network transmission.

2. Enable serial command function.



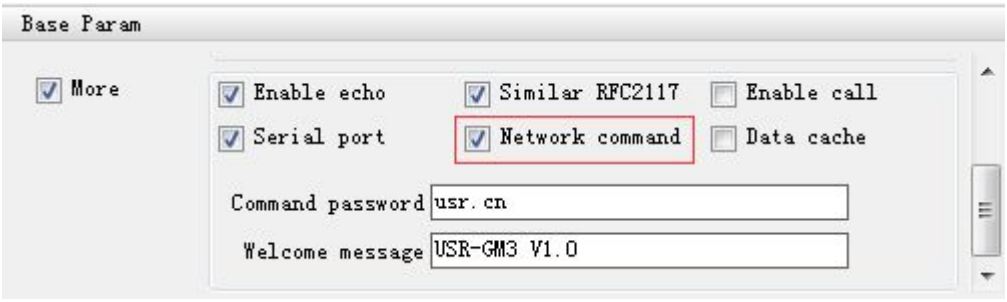
3. Query command password.

After setting successful, restart GM3, then send “usr.cn#AT+VER” via serial. Then GM3 will respond the firmware version.

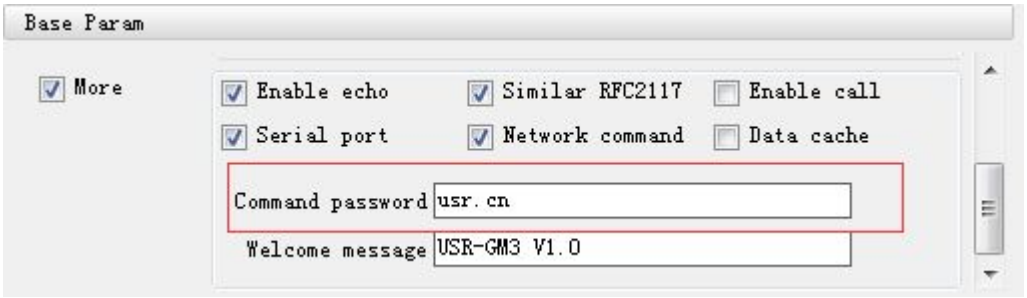


4.1.2.4.2. Network AT command

1. Enable network command function.

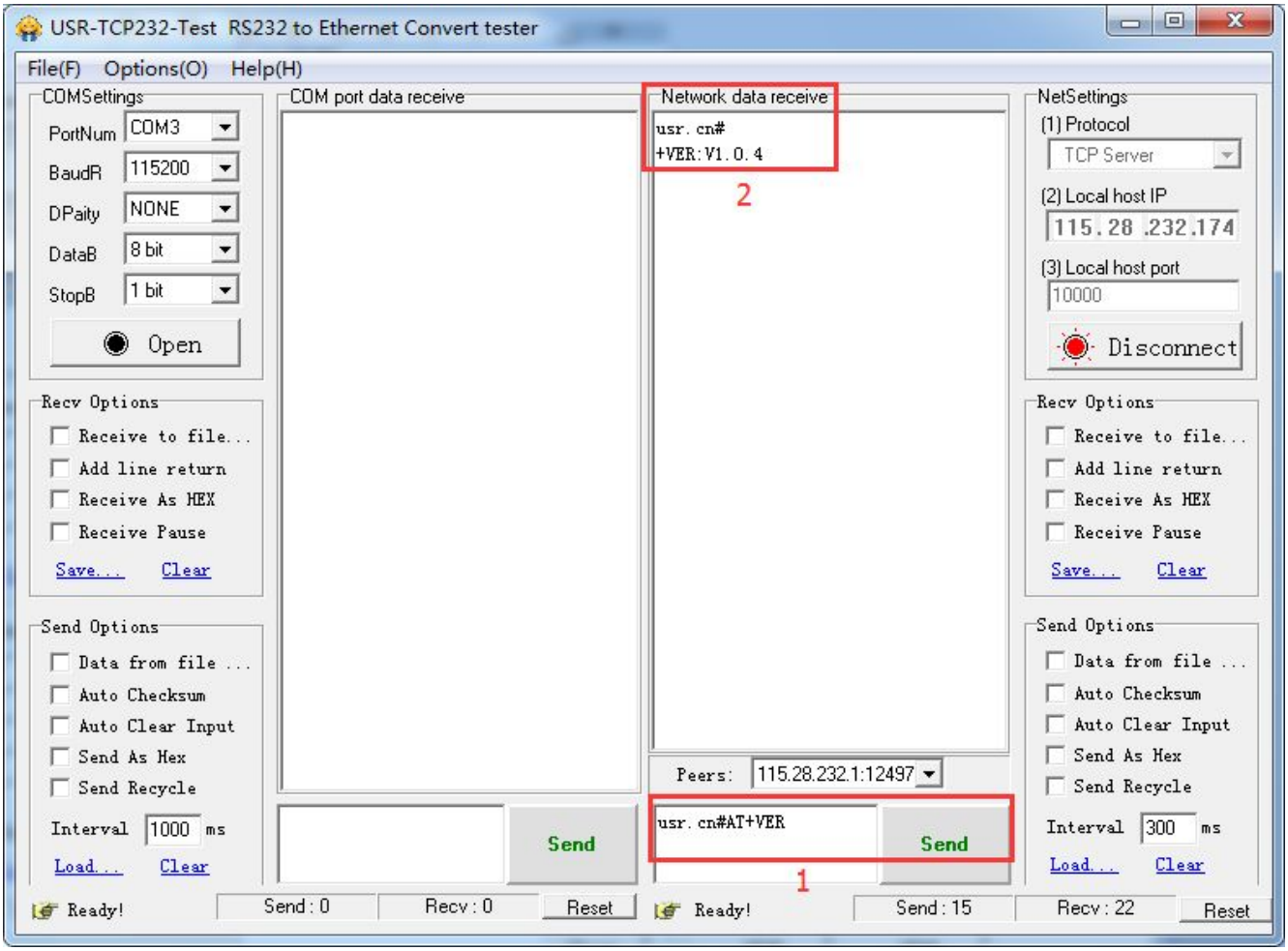


2. Query command password.



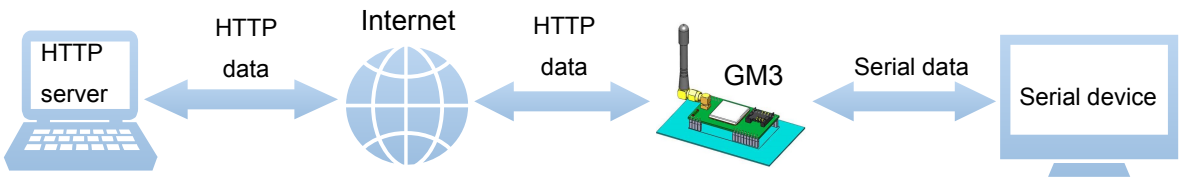
Besides, customers need to configure socket A or socket B for network connection, refer to

chapter 4.1.2.3. After setting successful, restart GM3. When connection is establishing, send “usr.cn#AT+VER” from network.



4.1.3. HTTPD Function

4.1.3.1. Description



Under this mode, customer’s serial device can request data from HTTP server via this module, Module can also receive data from HTTP server, analysis the data and transmit the

data to customer's serial device.

Customers don't need to know the detail of communication, just need some simple setting.

4.1.3.2. Application Scenarios

If customer want to request data from HTTP server, and customer's serial device can't connect to Internet via a router. But signal from base station is available, so customer can use GM3 module to make this communication. Customer just need to do some simple setting, and send request data. GM3 could get the result from HTTP server, and analysis it to get the useful data, send the data to serial device.

4.1.3.3. Usage

Note: All the AT commands terminate with carriage return(0x0D), we ignore it here.
About how to use AT commands, please refer to chapter 5.

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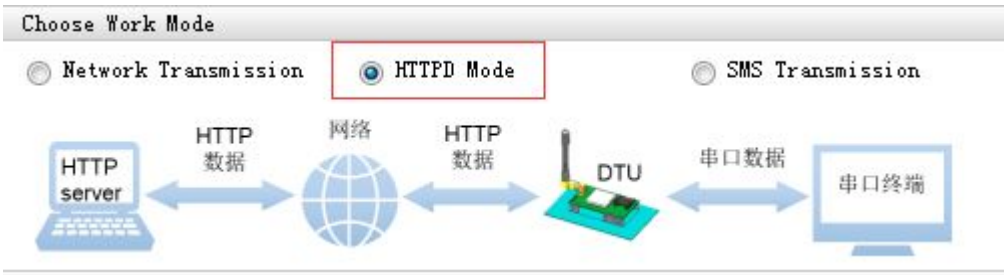
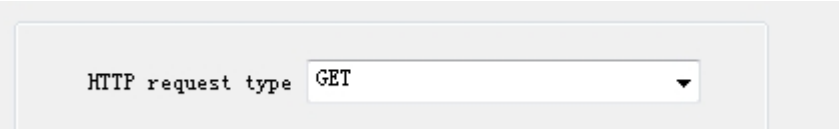
And we have one software for customers to do serial and network tests, customers can get it from our website:**http://www.usriot.com/Product/78.html**.

1. Setting

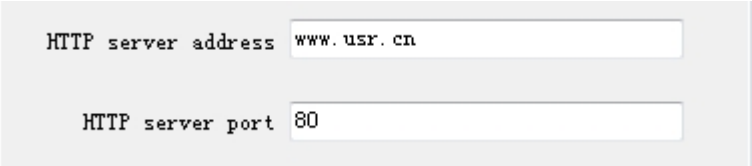
1) Set work mode as HTTPD.



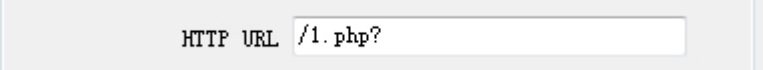
2) Set request type as GET.



3) Set the address of HTTP server as “www.usr.cn”, and set server port as 80.

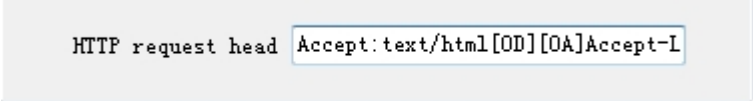


4) Set the request URL as ”/1.php?”



5) Set request head string.

”Accept:text/html[0D][0A]Accept-Language:zh-CN[0D][0A]User-Age nt: Mozilla/5.0[0D][0A]Connection: Keep-Alive[0D][0A]”



NOTE:
[0D] means carriage return, it is 0x0D in hex number. [0A] means line feed, it is 0x0A in hex number. Because this kind of data is not able to be put into AT commands string, so it is tropical. The rule is two bytes in [] means one byte in hex form.
For example,
“[0D]” means carriage return, 0x0D in hex number.
“[20]” means space, 0x20 in hex number.

2. Restart module, then send “data=www.usr.cn” to HTTP server via serial port， you will get [www.usr.cn] from server.

NOTE: the server “www.usr.cn” is USR’s HTTP test server, if you send “data=www.usr.cn” to it, it will feed back the data after “=” with “[]” including.

In the step 1, serial device send “data=www.usr.cn” to GM3, then GM3 prepares HTTP package with head information set before, so the package data is:

GET /1.php?data=www.usr.cn HTTP/1.1
Host: www.usr.cn
Accept:text/html
Accept-Language:zh-CN
User-Agent: Mozilla/5.0
Connection: Keep-Alive

After sending data, GM3 receives data:

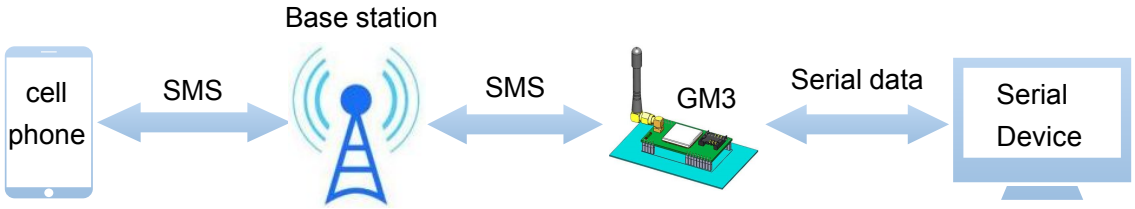
HTTP/1.1 200 OK
Date: Wed, 24 Jun 2015 04:08:35 GMT
Server: Apache/2.0.63 (Win32) mod_ssl/2.0.65 OpenSSL/0.9.8o PHP/5.2.14
X-Powered-By: PHP/5.2.14
Cache-Control: max-age=600
Expires: Wed, 24 Jun 2015 04:18:35 GMT
Content-Length: 19
Keep-Alive: timeout=15, max=99
Connection: Keep-Alive
Content-Type: text/html

[www.usr.cn]

After GM3 receives the above data, it will analysis the information, and send the result to serial device.

4.1.4. SMS Message Transmission

4.1.4.1. Description



Under this mode, customer's serial device can send SMS message to a cell phone via this module, Module can also receive SMS message from cell phone, and transmit the message in serial data to customer's serial device.

Customers don't need to know the detail of communication, just need some simple setting.

4.1.4.2. Application Scenarios

If user's device is a serial device, it is placed at remote area. User wants to communicate with this device by SMS message, to check what status the device is in, or to control the device.

4.1.4.3. Usage

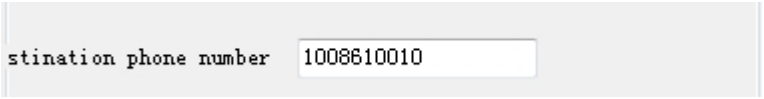
Note: All the AT commands terminate with carriage return(0x0D), we ignore it here. About how to use AT commands, please refer to chapter 5.

We have one software for customers to use, customers can get it from our website:**http://www.usriot.com/Download/248.html.**

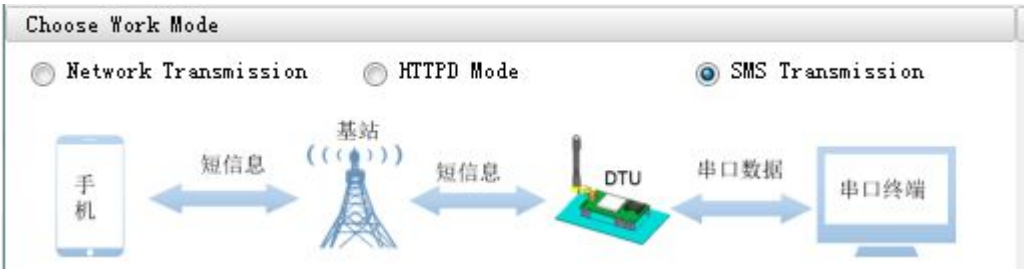
And we have one software for customers to do serial and network tests, customers can get it from our website:**http://www.usriot.com/Product/78.html**.

1. Setting

1) Set the destination phone number.



2) Set work mode as SMS message transmission.



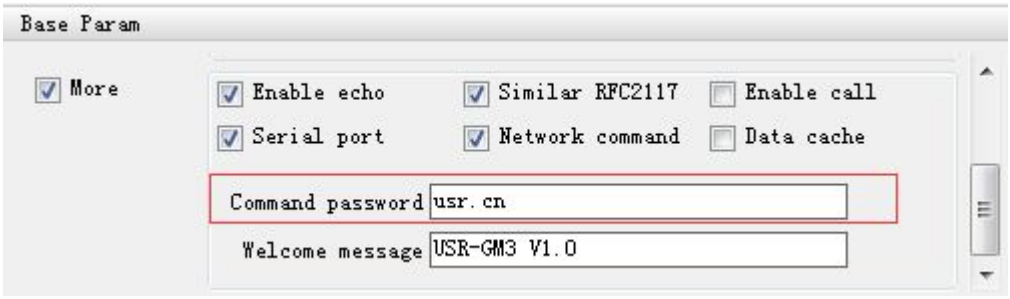
2. Reset module, and send message to module via serial port, then you will get the message on your cellphone. Then send a message back to module, then you will get the message from module's serial port.

0.53K/s
15:48
+8615688837786 (2)
山东济南
短信/彩信
2
www.usr.cn
济南有人物联网技术有限公司
3
短信

4.1.4.4. SMS AT Command

Note: every command string should terminate with carriage return. Here we use [0D].

1. Query command password.



Besides, customers need to configure SMS message transmission, refer to chapter 4.1.4.3. After setting successful, restart GM3. send “usr.cn#AT+VER” to GM3 from cellphone, then then you will get response from GM3.

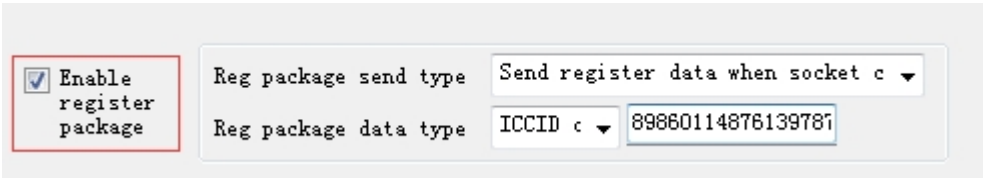
4.2. Register Package

4.2.1. Description

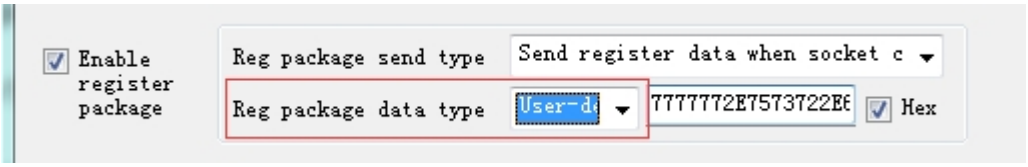
Under network transmission mode, customers can send Register Package, Register Package is used to make server know what device is sending data, or as a password. Customers can choose to send register package to network server, or serial device. Register Package could be sent when network connection is established, or as the head of every TCP/UDP package. The type of register package could be ICCID ,IMEI, or user-defined data.

4.2.2. Usage

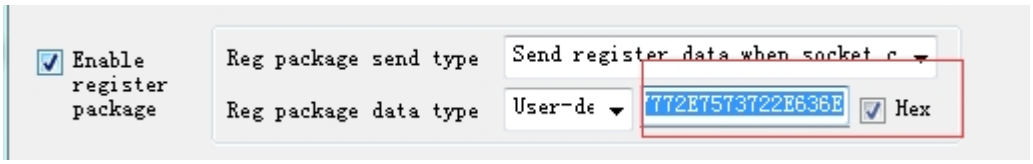
1. Enable sending register package.



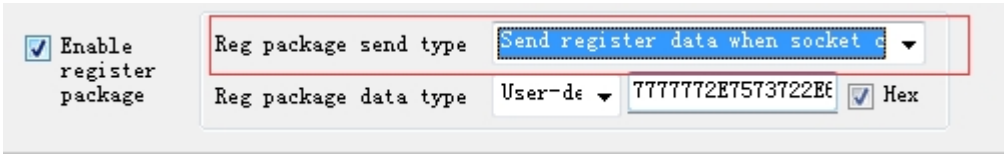
2. Set the type of register package data. for instance, using user-defined data.



3. Set user-defined register data, for instance, set data as string “www.usr.cn”, you need to convert it to hex string “7777772E7573722E636E”.



4. Set sending type, for instance, send data when connection is established.



Besides, customers need to configure socket A or socket B for network connection, refer to chapter 4.1.2.3. After setting successful, restart GM3. When connection is establishing, GM3 will send string “www.usr.cn” to server via socket A and socket B.

4.3. Heart Beat Package

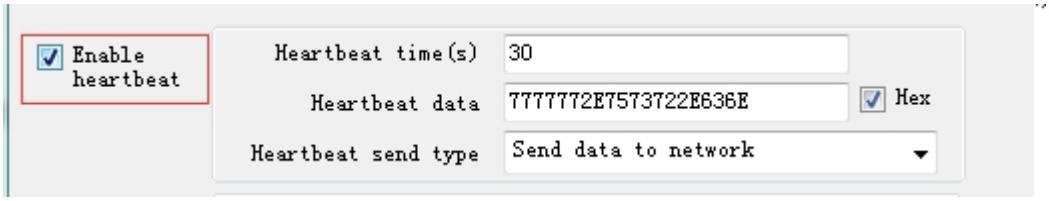
4.3.1. Description

Under network transmission mode, customers can send Heart Beat Package to network server or serial device.
Sending heart beat data to network server, is used to check if connection is alive. If GM3 sends data unsuccessful for 3 times, it will try to reconnect to server.

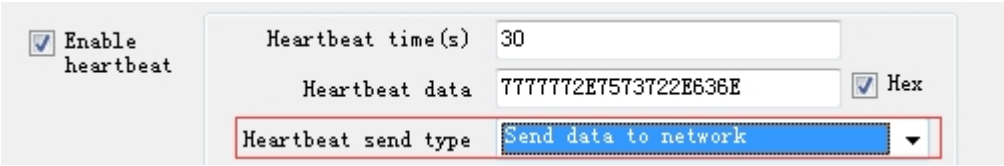
Sending heart beat data to serial device , is usually used to query information from serial device instead of sending query command from server, To do this can cut some communication flow.

4.3.2. Usage

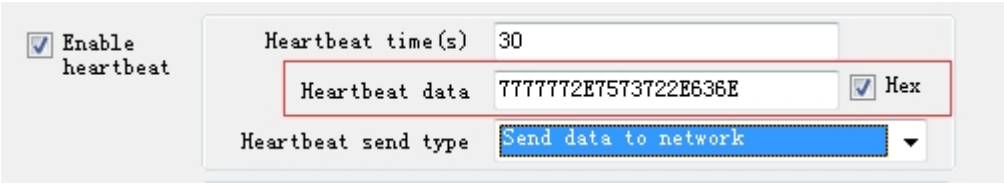
1. Enable sending heart beat package.



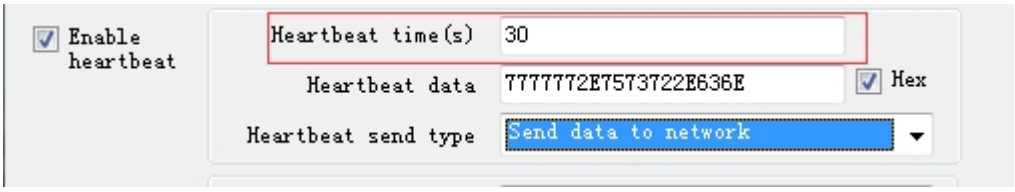
2. Set the destination of heart beat package data. for instance, to network server.



3. Set heart beat data, for instance, set data as string “www.usr.cn”, customer need to convert it to hex string “7777772E7573722E636E”.



4. Set sending period, for instance, 30 seconds.



Besides, customers need to configure socket A or socket B for network connection, refer to chapter 4.1.2.3. After setting successful, restart GM3. When connection is establishing, If device is idle for 30 seconds, GM3 will send string “www.usr.cn” to server via socket A and socket B.

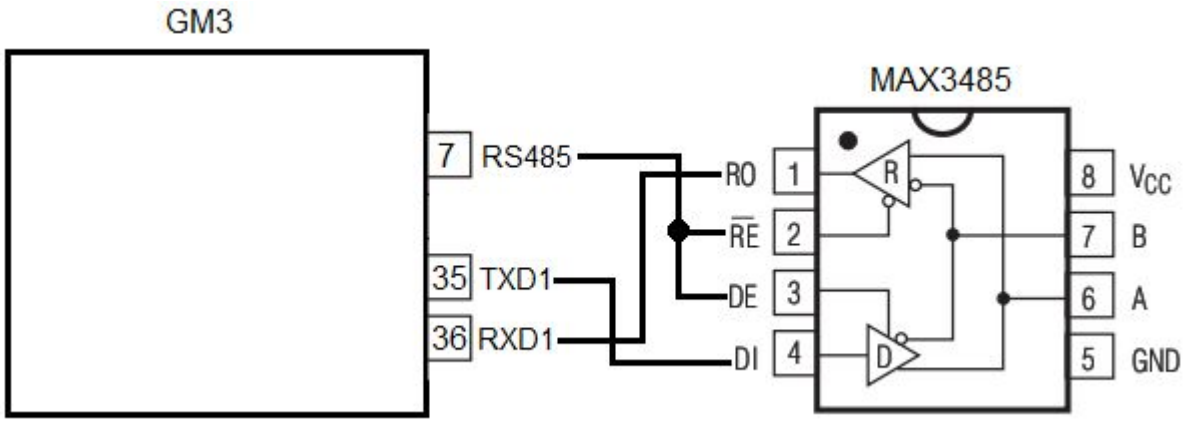
4.4. UART

4.4.1. RS485

4.4.1.1. Description

GM3 module supports RS485 function. RS485 is half duplex, the direction of transmitting data should be controlled manually. If customer enables module's RS485 function, the pin 7 of module is used to control the direction of communication.
Refer to command AT+UART

4.4.1.2. RS485 Reference Circuit



4.4.2. Similar RFC2217

4.4.2.1. Description

This function is similar to RFC2217. Customer can change the parameters of serial port dynamically via network. This modification is temporary, when module restarts, the parameters changed will return back to previous values.

4.4.2.2. Definition of similar RFC2217

This protocol contains 8 bytes, details as the following form

Item	Head	Baud Rate	Bits Parameters	Check Sum
bytes	3	3	1	1
interpretation	Fixed data	MSB	Refer to the following table	Sum of Baud Rate and Bits Parameters
Exmaple1 (115200,N,8,1)	55 AA 55	01 C2 00	83	46
Exmaple2 (9600,N,8,1)	55 AA 55	00 25 80	83	28

Interpretation of bits parameters

Bits	Interpretation	Value	Description
1:0	Data bits	00	Not Used
		01	Not Used
		10	7
		11	8
2	Stop bits	0	1
		1	2
3	Enable/disable parity	0	disable
		1	enable
5:4	Parity type	00	ODD
		01	EVEN
		10	Not Used
		11	Not Used
7:6	No defined	00	Not Used

5. Parameters Setting

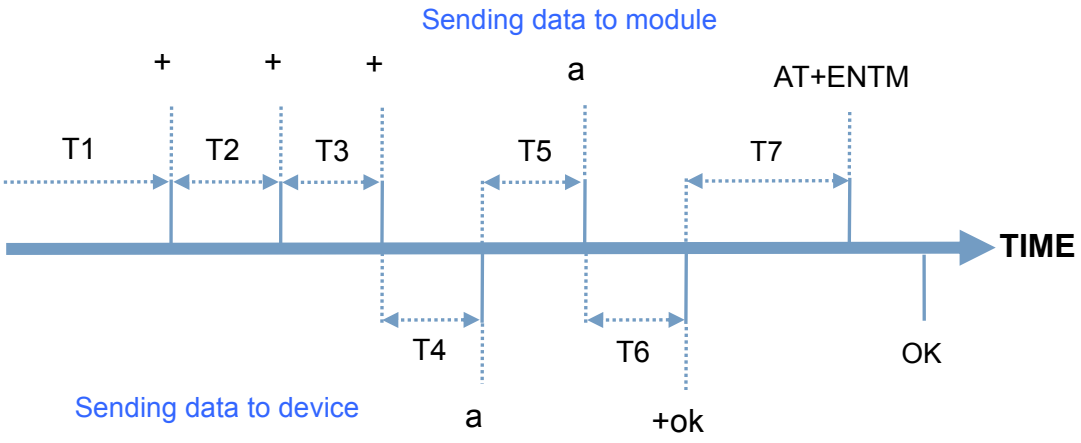
Sending AT commands is the only way to set the parameters of GM3 module. There are two kinds of commands, basic AT commands and extended AT commands.

Basic AT commands are used to setting the running parameters of GM3 under SMS message transmission, network transmission and HTTPD modes.

Extended AT commands are used to design new functions by customers. About how to use extended AT command, please refer to “GM3 extended AT commands User Guide”.

5.1. Operating AT command

When GM3 works in one of the three modes: SMS message transmission, network transmission or HTTPD mode. You can get module into “command mode” by sending specific timing data to it, then send commands to change module’s running parameters. If changing is done, get module back to previous work mode.



In the above figure, abscissa axis means time, the data above time axis is sent to module from device, and the data bellow time axis is sent to device from module.

time requirement:
T1 > 200ms
T2 < 50ms
T3 < 50ms
T5 < 3s

Go into command mode:

1.Module is in SMS message transmission, network transmission or HTTPD mode.

2.Device send “+++” to module, then module send ‘a’ to device.

3.If device receives ‘a’, it must send ‘a’ to module within 3 seconds.

4.Module receives ‘a’, and sends “+ok” to device.

5.Device receives “+ok”, it means module has gone to temporary command mode, so device can send AT commands to module.

Back to previous mode:

1. Device send command “AT+ENTM” to module.

2. Module receives “AT+ENTM”, and send “OK” to device.

3. Device receives “OK”, it means module has gone back to previous mode.

5.2. AT Command Format

AT commands work in asking-answering mode, “asking” means device sends commands to module, “answering” means module responds to device.

Symbol Description:

<>	content inside is necessary.
[]	content inside is not necessary.
{}	range, for example, A~B means the range is from A to B.
~	carriage return, hex number is 0D.
CMD	command code
OP	operator
PARA	parameter
CR	carriage return
LF	line feed

1) The format of asking

Command string: <AT+>[CMD][OP][PARA]<CR>

Code	meaning	necessary
AT+	AT command head	Yes
CMD	purpose of command	Yes
OP	action type of command	No
PARA	parameters of command	No
CR	termination of command	Yes

Type of command

type	Command string	description
0	AT+{CMD}?{CR}	query parameters
1	AT+{CMD}=?{CR}	Query the value of parameter
2	AT+{CMD}{CR}	execute action or query parameters
3	AT+{CMD}={PARAM}{CR}	Set the value of parameter

2) The format of answering

There are two kinds of response, with or without echo.
All the followings are using without echo as examples.

Command string: [CR][LF][+CMD][OP][PARA][CR][LF]<CR><LF>[OK]<CR><LF>

Code	meaning	necessary
CR	carriage return	No
LF	line feed	No
+CMD	response head	No
OP	operator	No
PARA	parameter	No
CR	carriage return	No
LF	line feed	No
CR	carriage return	Yes
LF	line feed	Yes
OK	operating successful	No
CR	carriage return	Yes
LF	line feed	Yes

Type of command

type	Command string	description
0	<CR><LF><OK><CR><LF>	successful
1	<CR><LF><+CMD:><PARA><CR><LF><CR><LF><OK><CR><LF>	return parameter

5.3. AT Command Set

NO.	command	description
Management commands		
1	H	help message
2	Z	restart
3	E	query and set enable/disable echo
4	ENTM	quit from command mode
5	WKMOD	query or set work mode
6	CALEN	query or set if allow to call
7	NATEN	query or set enable/disable network command
8	UATEN	query or set enable/disable serial port command
9	CMDPW	query or set command password
10	CACHEN	query or set enable/disable data cache
11	STMSG	query or set welcome message
Configuration commands		
12	S	Save current settings
13	RELD	restore default settings
14	CLEAR	restore factory settings
15	CFGTF	save current setting as default setting
Query information commands		
16	VER	query firmware version
17	SN	query SN code
18	ICCID	query CCID code
19	IMEI	query IMEI code
20	CNUM	query the MS ISDN related to the subscriber
UART parameters commands		
21	UART	query or set serial port parameters
22	RFCEN	query or set enable/disable similar RFC2117
Socket parameters commands		
23	APN	query or set APN code
24	SOCKA	query or set socket A parameters
25	SOCKB	query or set socket B parameters
26	SOCKAEN	query or set enable/disable socket A
27	SOCKBEN	query or set enable/disable socket B
28	SOCKASL	query or set socket A long or short connection

29	SOCKBSL	query or set socket B long or short connection
30	SOCKALK	query socket A connection status
31	SOCKBLK	query socket B connection status
Register package parameters commands		
32	REGEN	query or set register package type
33	REGTP	query or set register package data type
34	REGID	query or set register ID（used for D2D）
35	REGDT	query or set register user-defined data
36	REGSND	query or set register package sending type
Heartbeat package parameters commands		
37	HEARTEN	query or set enable/disable heartbeat
38	HEARTDT	query or set heartbeat data
39	HEARTTP	query or set heartbeat package sending type
40	HEARTTM	query or set heartbeat time
HTTPD parameters commands		
41	HTPTP	query or set HTTP request type
42	HTPURL	query or set HTTP URL
43	HTPSV	query or set HTTP server address and port
44	HTPHD	query or set HTTP request head
SMS message parameters commands		
45	DSTNUM	query or set destination phone number
46	SMSEND	send SMS message

1) AT+H

- function : help message.
- format :
  - query :

    AT+H{CR}

    {CR}{LF}help message{CR}{LF}{CR}{LF}OK{CR}{LF}
- parameter :
  - help message : commands introduction。

2) AT+Z

- function : restart。
- format :

  AT+Z{CR}

  {CR}{LF}OK{CR}{LF}

3) AT+E

- function : query and set enable/disable echo.
- format :
  - Query parameter introductions :
    AT+E=?{CR}
    {CR}{LF}+E:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+E{CR} or AT+E?{CR}
    {CR}{LF}+E:status{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+E=status{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - status : enable or disable echo
    - “on” : enable
    - “off” : disable

4) AT+ENTM

- function : quit from command mode.
- format :
  - setting:
    AT+ENTM{CR}
    {CR}{LF}OK{CR}{LF}

5) AT+WKMOD

- function : query or set work mode.
- format :
  - query parameter introductions:
    AT+WKMOD=?{CR}
    {CR}{LF}+WKMOD:<"CMD","SMS","NET","HTTPD">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+WKMOD{CR} or AT+WKMOD?{CR}
    {CR}{LF}+WKMOD:mode{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+WKMOD=mode{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - mode : work mode
    - “CMD” : AT command mode
    - “SMS” : SMS message transmission mode
    - “NET” : network transmission mode
    - “HTTPD” : HTTPD mode

6) AT+CALEN

- function : query or set if allow to call.
- format :
  - query parameter introductions:
    AT+CALEN=?{CR}
    {CR}{LF}+CALEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+CALEN{CR} or AT+CALEN?{CR}
    {CR}{LF}+CALEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+CALEN=status{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - status : enable or disable call
    - “on” : enable
    - “off” : disable

7) AT+NATEN

- function : query or set enable/disable network command.
- format :
  - query parameter introductions:
    AT+NATEN=?{CR}
    {CR}{LF}+NATEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+NATEN{CR} or AT+NATEN?{CR}
    {CR}{LF}+NATEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+NATEN=status{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - status : enable or disable network command
    - “on” : enable
    - “off” : disable

8) AT+UATEN

- function : query or set enable/disable serial port command
- format :
  - query parameter introductions:
    AT+UATEN=?{CR}
    {CR}{LF}+UATEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}

- query current value of parameter:
  AT+UATEN{CR} or AT+UATEN?{CR}
  {CR}{LF}+UATEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
- set parameter:
  AT+UATEN=status{CR}
  {CR}{LF}OK{CR}{LF}

➢ parameter :
- status : enable or disable serial port command.
  - “on” : enable
  - “off” : disable

9) AT+CMDPW

➢ function : query or set command password
➢ format :
- query parameter introductions:
  AT+CMDPW=?{CR}
  {CR}{LF}+CMDPW:<"password">{CR}{LF}{CR}{LF}OK{CR}{LF}
- query current value of parameter:
  AT+CMDPW{CR} or AT+CMDPW?{CR}
  {CR}{LF}+CMDPW:password{CR}{LF}{CR}{LF}OK{CR}{LF}
- set parameter:
  AT+CMDPW=password{CR}
  {CR}{LF}OK{CR}{LF}

➢ parameter :
- password : command password

10) AT+CACHEN

➢ function : query or set enable/disable data cache.
➢ format :
- query parameter introductions:
  AT+CACHEN=?{CR}
  {CR}{LF}+CACHEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
- query current value of parameter:
  AT+CACHEN{CR} or AT+CACHEN?{CR}
  {CR}{LF}+CACHEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
- set parameter:
  AT+CACHEN=status{CR}
  {CR}{LF}OK{CR}{LF}

➢ parameter :
- status : enable/disable data cache.
  - “on” : enable
  - “off” : disable

11) AT+STMSG

- function : query or set welcome message.
- format :
  - query parameter introductions:
    AT+STMSG=?{CR}
    {CR}{LF}+STMSG:<"welcome message">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+STMSG{CR} or AT+STMSG?{CR}
    {CR}{LF}+STMSG:message{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+STMSG=message{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - message : welcome message，when module powers up, it will show them, this can be used to check if module starts up normally.

12) AT+S

- function : save current settings.
- format :
  - setting:
    AT+S{CR}
    {CR}{LF}OK{CR}{LF}

13) AT+RELD

- function : restore default settings.
- format :
  - setting:
    AT+RELD{CR}
    {CR}{LF}OK{CR}{LF}

14) AT+CLEAR

- function : restore factory settings.
- format :
  - setting:
    AT+CLEAR{CR}
    {CR}{LF}OK{CR}{LF}

15) AT+CFGTF

- function : save current setting as default setting.
- format :
  - setting:
    AT+CFGTF{CR}
    {CR}{LF}OK{CR}{LF}

16) AT+VER
- function : query version.
- format :
  - query current value of parameter:
    AT+VER{CR} or AT+VER?{CR}
    {CR}{LF}+VER:version{CR}{LF}{CR}{LF}OK{CR}{LF}
- parameter :
  - version : firmware version

17) AT+SN
- function : query SN code.
- format :
  - query current value of parameter:
    AT+SN{CR} or AT+SN?{CR}
    {CR}{LF}+SN:code{CR}{LF}{CR}{LF}OK{CR}{LF}
- parameter :
  - code : SN code

18) AT+ICCID
- function : query ICCID code.
- format :
  - query current value of parameter:
    AT+ICCID{CR} or AT+ICCID?{CR}
    {CR}{LF}+ICCID:code{CR}{LF}{CR}{LF}OK{CR}{LF}
- parameter :
  - code : ICCID code

19) AT+IMEI
- function : query IMEI code.
- format :
  - query current value of parameter:
    AT+IMEI{CR} or AT+IMEI?{CR}
    {CR}{LF}+IMEI:code{CR}{LF}{CR}{LF}OK{CR}{LF}
- parameter :
  - code : IMEI code

20) AT+CNUM

- function : query the MS ISDN related to the subscriber.
- format :
  - query current value of parameter:
    AT+CNUM{CR} or AT+CNUM?{CR}
    {CR}{LF}+CNUM:phone number{CR}{LF}{CR}{LF}OK{CR}{LF}
- parameter :
  - phone number : phone number

21) AT+UART

- function : query or set serial port parameters.
- format :
  - query parameter introductions:
    AT+UART=?{CR}
    {CR}{LF}+UART:<2400,4800,9600,14400,19200,28800,33600,38400,57600,115200,230400,460800,921600>,<"NONE","ODD","EVEN">,<7,8>,<1,2>,<"NONE","CRTS","RS485">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+UART{CR} or AT+UART?{CR}
    {CR}{LF}+UART:baud,parity,data bit,stop bit,flow control{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+UART=baud,parity,data bit,stop bit,flow control{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - baud : baud rate
    2400,4800,9600,14400,19200,28800,33600,38400,57600,115200,230400,460800,921600
  - parity :
    - “NONE” : no parity
    - “ODD” : odd parity
    - “EVEN” : even parity
  - data bit :
    - 7 : 7 data bits
    - 8 : 8 data bits
  - flow control :
    - “NONE” : no flow control
    - “CRTS” : use RTS/CTS for flow control
    - “RS485” : use RS485 function

22) AT+RFCEN

- function : query or set enable/disable similar RFC2117.
- format :
  - query parameter introductions:
    AT+RFCEN=?{CR}
    {CR}{LF}+RFCEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+RFCEN{CR} or AT+RFCEN?{CR}
    {CR}{LF}+RFCEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+RFCEN=status{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - status : enable/disable similar RFC2117
    - “on” : enable
    - “off” : disable

23) AT+APN

- function : query or set APN code.
- format :
  - query parameter introductions:
    AT+APN=?{CR}
    {CR}{LF}+APN:<"code">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+APN{CR} or AT+APN?{CR}
    {CR}{LF}+APN:code{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+APN=code{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - **code** : APN code

24) AT+SOCKA

- function : query or set socket A parameters.
- format :
  - query parameter introductions:
    AT+SOCKA=?{CR}
    {CR}{LF}+SOCKA:<"TCP","UDP">,<"address">,<port>{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+SOCKA{CR} or AT+SOCKA?{CR}

{CR}{LF}+SOCKA:protocol,address,port{CR}{LF}{CR}{LF}OK{CR}{LF}

- set parameter:
  AT+SOCKA=protocol,address,port{CR}
  {CR}{LF}OK{CR}{LF}

- parameter :
  - protocol : communication protocol
    - "TCP" : TCP
    - "UDP" : UDP
  - address : server address, IP or domain name
  - port : server port，1~65535

25) AT+SOCKB

- function : query or set socket B parameters.
- format :
  - query parameter introductions:
    AT+SOCKB=?{CR}
    {CR}{LF}+SOCKB:<"TCP","UDP">,<"address">,<port>{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+SOCKB{CR} or AT+SOCKB?{CR}
    {CR}{LF}+SOCKB:protocol,address,port{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+SOCKB=protocol,address,port{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - protocol : communication protocol
    - "TCP" : TCP
    - "UDP" : UDP
  - address : server address, IP or domain name
  - port : server port，1~65535

26) AT+SOCKAEN

- function : query or set enable/disable socket A.
- format :
  - query parameter introductions:
    AT+SOCKAEN=?{CR}
    {CR}{LF}+SOCKAEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+SOCKAEN{CR} or AT+SOCKAEN?{CR}
    {CR}{LF}+SOCKAEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:

AT+SOCKAEN=status{CR}
{CR}{LF}OK{CR}{LF}

- parameter :
  - status : enable or disable socket A
    - "on" : enable
    - "off" : disable

27) AT+SOCKBEN

- function : query or set enable/disable socket B.
- format :
  - query parameter introductions:
    AT+SOCKBEN=?{CR}
    {CR}{LF}+SOCKBEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+SOCKBEN{CR} or AT+SOCKBEN?{CR}
    {CR}{LF}+SOCKBEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+SOCKBEN=status{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - status : enable or disable socket B.
    - "on" : enable
    - "off" : disable

28) AT+SOCKASL

- function : query or set socket A long or short connection.
- format :
  - query parameter introductions:
    AT+SOCKASL=?{CR}
    {CR}{LF}+SOCKASL:<"short","long">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+SOCKASL{CR} or AT+SOCKASL?{CR}
    {CR}{LF}+SOCKASL:type{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+SOCKASL=type{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - type : connection style
    - "short" : short connection
    - "long" : long connection

29) AT+SOCKBSL

- function : query or set socket B long or short connection.
- format :
  - query parameter introductions:
    AT+SOCKBSL=?{CR}
    {CR}{LF}+SOCKBSL:<"short","long">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+SOCKBSL{CR} or AT+SOCKBSL?{CR}
    {CR}{LF}+SOCKBSL:type{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+SOCKBSL=type{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - type : connection style
    - “short” : short connection
    - “long” : long connection

30) AT+SOCKALK

- function : query socket A connection status.
- format :
  - query current value of parameter:
    AT+SOCKALK{CR} or AT+SOCKALK?{CR}
    {CR}{LF}+SOCKALK:status{CR}{LF}{CR}{LF}OK{CR}{LF}
- parameter :
  - status : socket A connection status.
    - “connected” : connected
    - “disconnected” : disconnected

31) AT+SOCKBLK

- function : query socket B connection status.
- format :
  - query current value of parameter:
    AT+SOCKBLK{CR} or AT+SOCKBLK?{CR}
    {CR}{LF}+SOCKBLK:status{CR}{LF}{CR}{LF}OK{CR}{LF}
- parameter :
  - status : socket B connection status.
    - “connected” : connected
    - “disconnected” : disconnected

32) AT+REGEN

- function : query or set enable/disable register package.

- format :
  - query parameter introductions:
    AT+REGEN=?{CR}
    {CR}{LF}+REGEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+REGEN{CR} or AT+REGEN?{CR}
    {CR}{LF}+REGEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+REGEN=status{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - status : enable or disable register package
    - “on” : enable
    - “off” : disable

33) AT+REGTP

- function : query or set register package data type.
- format :
  - query parameter introductions:
    AT+REGTP=?{CR}
    {CR}{LF}+REGTP:<"ICCID","IMEI","REGID","REGDT">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+REGTP{CR} or AT+REGTP?{CR}
    {CR}{LF}+REGTP:type{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+REGTP=type{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - type : type of register data
    - “ICCID” : ICCID code
    - “IMEI” : IMEI code
    - “REGID” : register ID (for D2D function)
    - “REGDT” : user-defined data

34) AT+REGID

- function : query or set register ID(used for D2D).
- format :
  - query parameter introductions:
    AT+REGID=?{CR}
    {CR}{LF}+REGID:<id>{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:

AT+REGID{CR} or AT+REGID?{CR}
{CR}{LF}+REGID:id{CR}{LF}{CR}{LF}OK{CR}{LF}

- set parameter:
  AT+REGID=id{CR}
  {CR}{LF}OK{CR}{LF}

- parameter :
  - id : register ID

35) AT+REGDT

- function : query or set register user-defined data.
- format :
  - query parameter introductions:
    AT+REGDT=?{CR}
    {CR}{LF}+REGDT:<data>{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+REGDT{CR} or AT+REGDT?{CR}
    {CR}{LF}+REGDT:data{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+REGDT=data{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - data : user-defined register data, hex string, max length is 80 bytes,
    for example, “7777772E7573722E636E” means “www.usr.cn” in ASCII.

36) AT+REGSND

- function : query or set register package sending type.
- format :
  - query parameter introductions:
    AT+REGSND=?{CR}
    {CR}{LF}+REGSND:<"link","data","link&data">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+REGSND{CR} or AT+REGSND?{CR}
    {CR}{LF}+REGSND:type{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+REGSND=type{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - type : sending type
    - “link” : send register data when socket connects
    - “data” : send register data as the head of every TCP/UDP package
    - “link&data” : support both of above two ways

37) AT+HEARTEN

- function : query or set enable/disable heartbeat.
- format :
  - query parameter introductions:
    AT+HEARTEN=?{CR}
    {CR}{LF}+HEARTEN:<"on","off">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+HEARTEN{CR} or AT+HEARTEN?{CR}
    {CR}{LF}+HEARTEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+HEARTEN=status{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - status : enable/disable heartbeat function
    - “on” : enable
    - “off” : disable

38) AT+HEARTDT

- function : query or set heartbeat data.
- format :
  - query parameter introductions:
    AT+HEARTDT=?{CR}
    {CR}{LF}+HEARTDT:<“data”>{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+HEARTDT{CR} or AT+HEARTDT?{CR}
    {CR}{LF}+HEARTDT:data{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+HEARTDT=data{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - data : heartbeat data, hex string, max length is 80 bytes,
    for example, “7777772E7573722E636E” means “www.usr.cn” in ASCII.

39) AT+HEARTTP

- function : query or set heartbeat package sending type.
- format :
  - query parameter introductions:
    AT+HEARTTP=?{CR}
    {CR}{LF}+HEARTTP:<"COM","NET">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+HEARTTP{CR} or AT+HEARTTP?{CR}

{CR}{LF}+HEARTTP:type{CR}{LF}{CR}{LF}OK{CR}{LF}

- set parameter:
  AT+HEARTTP=type{CR}
  {CR}{LF}OK{CR}{LF}

- parameter :
  - type : sending type
    - “COM” : send data to serial port
    - “NET” : send data to network

40) AT+HEARTTM

- function : query or set heartbeat time.
- format :
  - query parameter introductions:
    AT+HEARTTM=?{CR}
    {CR}{LF}+HEARTTM:<"time">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+HEARTTM{CR} or AT+HEARTTM?{CR}
    {CR}{LF}+HEARTTM:time{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+HEARTTM=time{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - time : strobe period，unit is second

41) AT+HTPTP

- function : query or set HTTP request type.
- format :
  - query parameter introductions:
    AT+HTPTP=?{CR}
    {CR}{LF}+HTPTP:<"GET","POST">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+HTPTP{CR} or AT+HTPTP?{CR}
    {CR}{LF}+HTPTP:type{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+HTPTP=type{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - type : HTTP request type
    - “GET” : get
    - “POST” : post

42) AT+HTPURL

- function : query or set HTTP URL.
- format :
  - query parameter introductions:
    AT+HTPURL=?{CR}
    {CR}{LF}+HTPURL:<"URL">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+HTPURL{CR} or AT+HTPURL?{CR}
    {CR}{LF}+HTPURL:URL{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+HTPURL=URL{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - URL : HTTP request URL

43) AT+HTPSV

- function : query or set HTTP server address and port.
- format :
  - query parameter introductions:
    AT+HTPSV=?{CR}
    {CR}{LF}+HTPSV:<"address">,<port>{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+HTPSV{CR} or AT+HTPSV?{CR}
    {CR}{LF}+HTPSV:address,port{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+HTPSV=address,port{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - address : server address，IP or domain name
  - port : server port，1~65535

44) AT+HTPHD

- function : query or set HTTP request head.
- format :
  - query parameter introductions:
    AT+HTPHD=?{CR}
    {CR}{LF}+HTPHD:<"head">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+HTPHD{CR} or AT+HTPHD?{CR}
    {CR}{LF}+HTPHD:head{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+HTPHD=head{CR}

{CR}{LF}OK{CR}{LF}

- parameter :
  - head : HTTP request head

45) AT+DSTNUM

- function : query or set destination phone number.
- format :
  - query parameter introductions:
    AT+DSTNUM=?{CR}
    {CR}{LF}+DSTNUM:<"number">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - query current value of parameter:
    AT+DSTNUM{CR} or AT+DSTNUM?{CR}
    {CR}{LF}+DSTNUM:number{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+DSTNUM=number{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - number : destination phone number in “SMS” mode.

46) AT+SMSEND

- function : send SMS message.
- format :
  - query parameter introductions:
    AT+SMSEND=?{CR}
    {CR}{LF}+SMSEND:<"number">,<1,2,3>,<"data">{CR}{LF}{CR}{LF}OK{CR}{LF}
  - set parameter:
    AT+SMSEND=number,type,data{CR}
    {CR}{LF}OK{CR}{LF}
- parameter :
  - number : destination phone number
  - type: coding scheme
    - 1 : ASCII coding，compressed
    - 2 : 8 bits coding，not compressed
    - 3 : UCS8 coding
  - data : content of SMS message

Appendix A: Contact

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Appendix B: Disclaimer

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Appendix C: Update History

2015-6-20 V1.0 basic version created
2015-6-20 V1.0.6 fix some errors, change reload pin function
2015-9-11 V1.0.7 increased use of setting software method

<END>